

## ABSTRACT OF THE DISCLOSURE

A linear scalable method computes a Fast Fourier Transform (FFT) or Inverse Fast Fourier transform (IFFT) in a multiprocessing system using a decimation in time approach. Linear scalability means, as the number of processor increases by a factor  $P$  (for example), the computational cycle reduces by exactly the same factor  $P$ . The method includes computing the first two stages of an  $N$ -point FFT/IFFT as a single radix-4 butterfly computation operation while implementing the remaining  $(\log_2 N - 2)$  stages as radix-2 operations. Each radix-2 operation employs a single radix-2 butterfly computation loop without employing nested loops. The method also includes distributing the computation of the butterflies in each stage such that each processor computes an equal number of complete butterfly calculations thereby eliminating data interdependency in the stage.

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